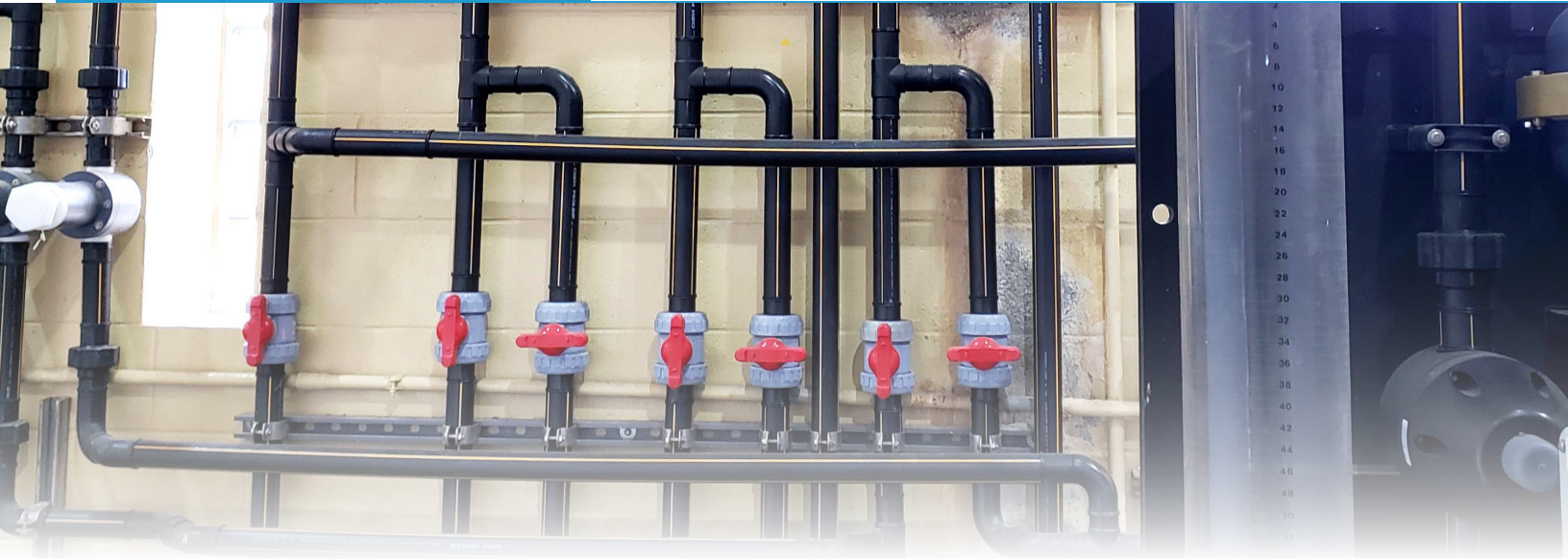


PIPING OVERVIEW



ASAHI/AMERICA'S INDUSTRIAL PIPING SYSTEMS

Asahi/America is committed to providing premier materials and manufacturing techniques for robust solutions to problems our customer face every day. Since 1984, Asahi/America has established a strong partnership with [AGRU Kunststofftechnik GmbH](#), headquartered in Austria, to provide high-grade thermoplastic industrial piping systems from materials such as polyethylene (PE), polypropylene (PP), polyvinylidene fluoride (PVDF), and ethylene-chlorotrifluoroethylene (ECTFE) to serve the U.S., Canadian, Australian, and Mexican markets.

Asahi/America's complete portfolio of industrial single wall piping systems ensures exceptional corrosion resistance, durability, and longevity even in the harshest operating environments. This results in fewer maintenance events, while providing prolonged operational efficiency, translating into substantial cost savings over the system's life cycle. When determining the entire cost of an industrial piping system, it is important to consider the following **factors**:

- Material/Chemical Compatibility
- Installation Techniques
- System Maintenance
- Expected Service Life



CHEM PROLINE®

ADVANCED PE

Polyethylene is one of the most common thermoplastic materials. Polyethylene (PE) is well known for its utility and commercial applications, but Asahi/America and AGRU offer Advanced PE, known as PE100RC, incorporating proprietary additives providing superior mechanical properties over traditional PE including chemical, ultraviolet (UV), stress crack, and abrasion resistance. Chem Proline® is ductile and has a temperature range from -40° F to 140° F (-40° C to 60° C).



PROLINE®

POLYPROPYLENE (PP)

Polypropylene belongs to the family of polyolefins and is derived from propylene monomers. It is known for its exceptional chemical resistance, high melting point, and relatively low density, making it suitable for a wide range of applications. Polypropylene is one of the best materials to use for systems exposed to varying pH levels, as many plastics do not handle both acids and bases well. Its upper temperature limit is 212° F (100° C).



SUPER PROLINE®

POLYVINYLIDENE FLUORIDE (PVDF)

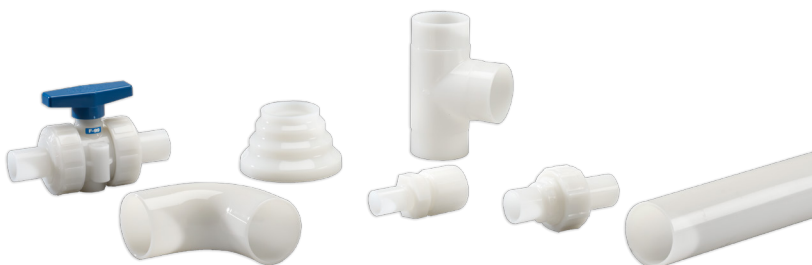
Polyvinylidene fluoride (PVDF) is a high molecular weight fluorocarbon and has superior abrasion resistance, dielectric properties and mechanical strength. These characteristics are maintained over a temperature range of -40° F to 248° F (-40° C - 120° C) with a limited range extended to 352° F (178° C). PVDF is highly resistant to bromine and other halogens, most strong acids, aliphatics, alcohols and chlorinated solvents.



ULTRA PROLINE®

ETHYLENE CHLOROTRIFLUOROETHYLENE (ECTFE)

Ethylene chlorotrifluoroethylene (ECTFE) is a 1:1 alternating copolymer of ethylene (E) and chlorotrifluoropethylene (CTFE). It contains about 80% CTFE, one of the most chemically resistant building blocks, which makes ECTFE the ultimate choice for chemical resistant piping systems. Additionally, ECTFE has a broad temperature range, from -22° F to 284° F (-30° C to 140° C).



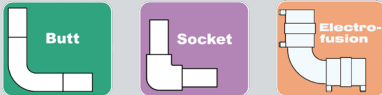
SYSTEM COMPARISON

CHEM PROLINE® (ADVANCED PE)

FEATURES & BENEFITS:

- Resistant to stress crack, slow crack growth, impact, abrasion, and UV
- High creep rupture strength
- High pressure load resistance
- Material temperature range as low as -40° F
- Reliable heat fusion joining technology eliminates cement and threads
- System can be installed directly in rough trenches

WELDING METHODS:



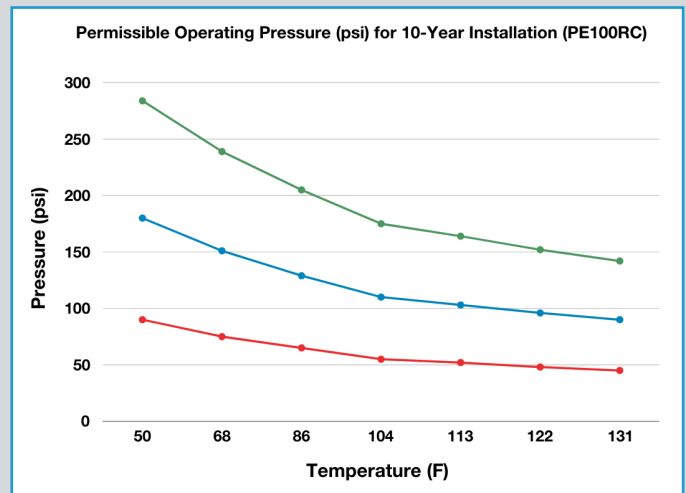
CERTIFICATIONS:

- NSF/ANSI/CAN 61-G
- Hydrogen (H2)

IDEAL APPLICATIONS:

- Bleach
- Industrial water
- Process chemical and waste
- Caustics
- Fuels
- Acids
- Hydrogen

PRESSURE RATING CHART:*

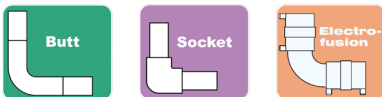


PROLINE® (PP)

FEATURES & BENEFITS:

- Wide pH range from 1 to 14
- High temperature range up to 212° F
- Ideal for varying medias and temperatures
- Reliable heat fusion joining technology
- Random copolymer fitting material provides higher weld strength and impact resistance

WELDING METHODS:



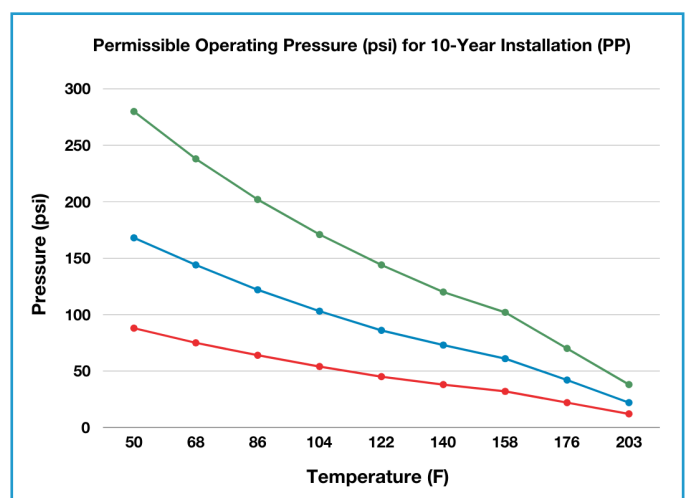
CERTIFICATIONS:

- NSF/ANSI/CAN 61-G

IDEAL APPLICATIONS:

- pH range 1-14
- Process chemical and waste drains
- Caustic
- Acids
- Industrial water

PRESSURE RATING CHART:*



SUPER PROLINE® (PVDF)

FEATURES & BENEFITS:

- Suitable for applications with pH range from 1 to 8 and at temperatures up to 248° F
- Ideal for chemical processing, up to 93% sulfuric acid
- Manufactured from the highest quality suspension-grade PVDF resin
- Excellent choice for chemical process applications that typically see varying temperatures

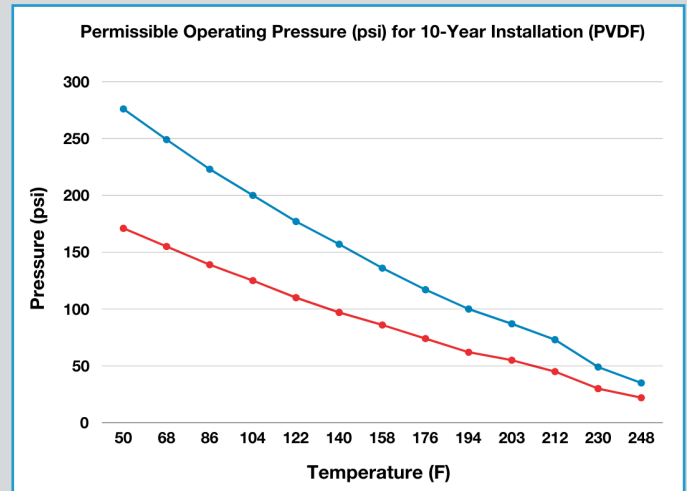
WELDING METHODS:



IDEAL APPLICATIONS:

- Up to 93% sulfuric acid (*please see our [best practices guide online](#) or scan the QR code to the right*)
- High temperature fluid transfer
- Acids

PRESSURE RATING CHART:*



Scan to view our sulfuric acid best practices guide!

ULTRA PROLINE® (ECTFE)

FEATURES & BENEFITS:

- Most chemically resistant piping system - compatible with the broadest range of applications
- Used for high concentrations of acids and highly oxidative applications (sulfuric and nitric acid, sodium hypochlorite, chlorine gas, ozone, chlorine dioxide)
- Suitable for solvents and/or high pH applications at elevated temperatures
- Ideal substitute for rigid PFA pipe
- High temperature range up to 248° F with pressure capacity to 203° F

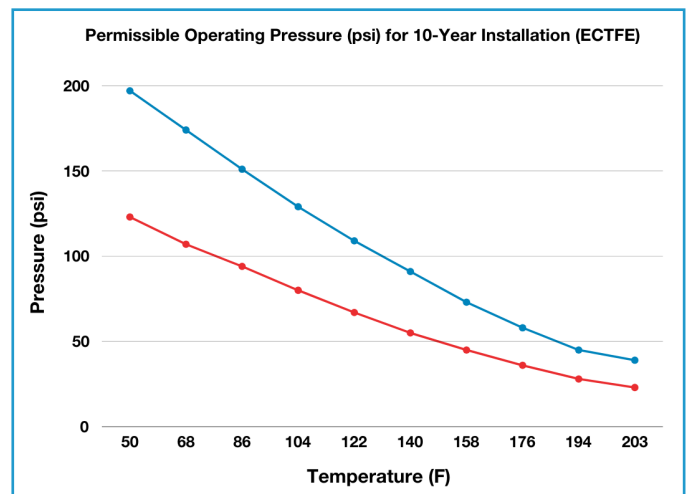
WELDING METHODS:



IDEAL APPLICATIONS:

- High chemical concentration
- Sulfuric acid (*please see our [best practices guide online](#) or scan the QR code to the right*)
- pH 1-14
- Bleach
- Strong oxidizing agents (chlorine, ozone, hydrogen peroxide)

PRESSURE RATING CHART:*



Scan to view our sulfuric acid best practices guide!

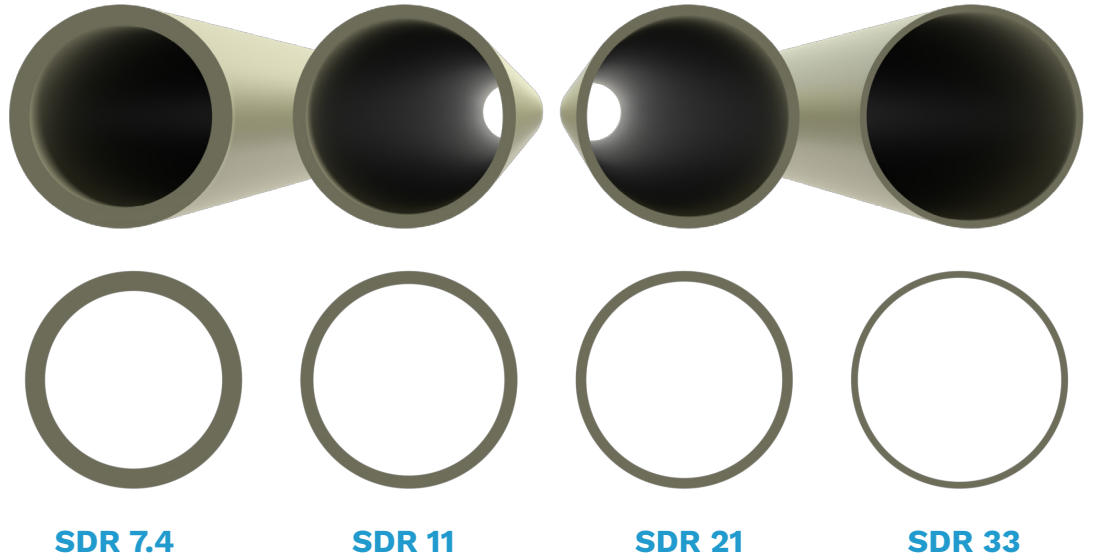
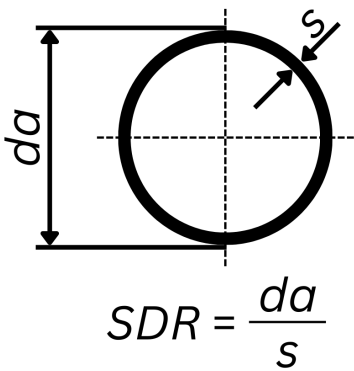
*Please consult product specifications on Asahi/America's website at www.asahi-america.com for complete pressure and temperature operating characteristics.

STANDARD DIMENSION RATIO (SDR)

WHAT IS STANDARD DIMENSION RATIO (SDR)?

Asahi/America's industrial piping systems are manufactured using a Standard Dimension Ratio (SDR). SDR is the ratio of the outside diameter to the wall thickness of the pipe. Therefore, as the outside diameter increases, the wall thickness increases proportionately.

SDR was developed to take advantage of thermoplastic material characteristics. For a given SDR and material, all pipe sizes within that product group will have the same operating pressures and temperature characteristics, offering consistency and simplicity for the designer. This is different from pipe schedule systems, which have varying pressure/temperature ratings as the pipe sizes increase.



PIPING SYSTEM DIMENSIONS*

BUTT PIPE & FITTINGS		Sizes - inches (mm)							
		1/2 (20)	2 (63)	3 (90)	6 (160)	12 (315)	18 (450)	20 (500)	24 (630)
Proline® PRO150 PP	(SDR 11)								
Proline® PRO90 PP	(SDR 17.6)								
Proline® PRO45 PP	(SDR 33)								
Chem Proline® Advanced PE	(SDR 11)								
Super Proline® PVDF	(SDR 21)								
	(SDR 33)								
Ultra Proline® ECTFE	(SDR 21)								

SOCKET PIPE & FITTINGS		Sizes - inches (mm)				
		1/2 (20)	1 (32)	2 (63)	3 (90)	4 (120)
Proline® PRO150 PP	(SDR 11)					
Proline® PRO90 PP	(SDR 17.6)					
Proline® PRO45 PP	(SDR 33)	Socket fusion not recommended for PRO45				
Chem Proline® Advanced PE	(SDR 7.4)	Available in 1/2" (20mm) and 3/4" (25mm) sizes				
	(SDR 11)					
Super Proline® PVDF	(SDR 21)					
Ultra Proline® ECTFE	(SDR 21)	Socket fusion not available for Ultra Proline®				

*Contact factory for availability of sizing not shown. Graphics just for reference and not representative of SDR wall thickness.

The fittings referenced above are a general sampling of what Asahi/America offers.
For more information on available fittings for each product line, please contact us.

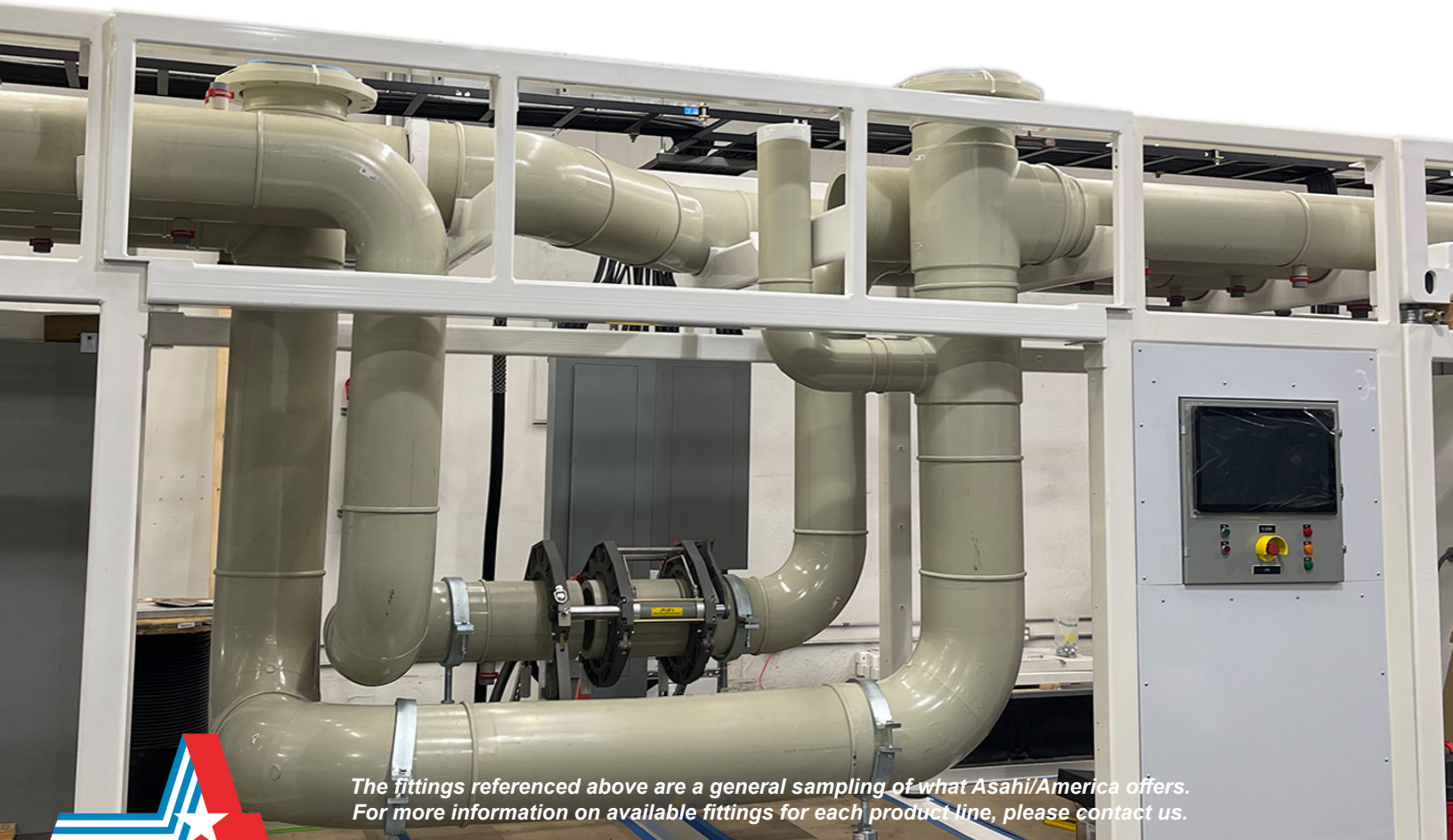
PIPING & FITTINGS

PIPING SYSTEM DIMENSIONS (CONT.)*

DRAINAGE PIPE & FITTINGS (SINGLE AND DOUBLE WALL)		Sizes - inches (mm)			
		1 (32)	8 (200)	12 (315)	16 (400)
Proline® PRO150 PP	(SDR 11)				
Proline® PRO90 PP	(SDR 17.6)				
Proline® PRO45 PP	(SDR 33)				
Chem Proline® Advanced PE	(SDR 11)				
Super Proline® PVDF	(SDR 21)				

*Contact factory for availability of sizing not shown. Graphics just for reference and not representative of SDR wall thickness.

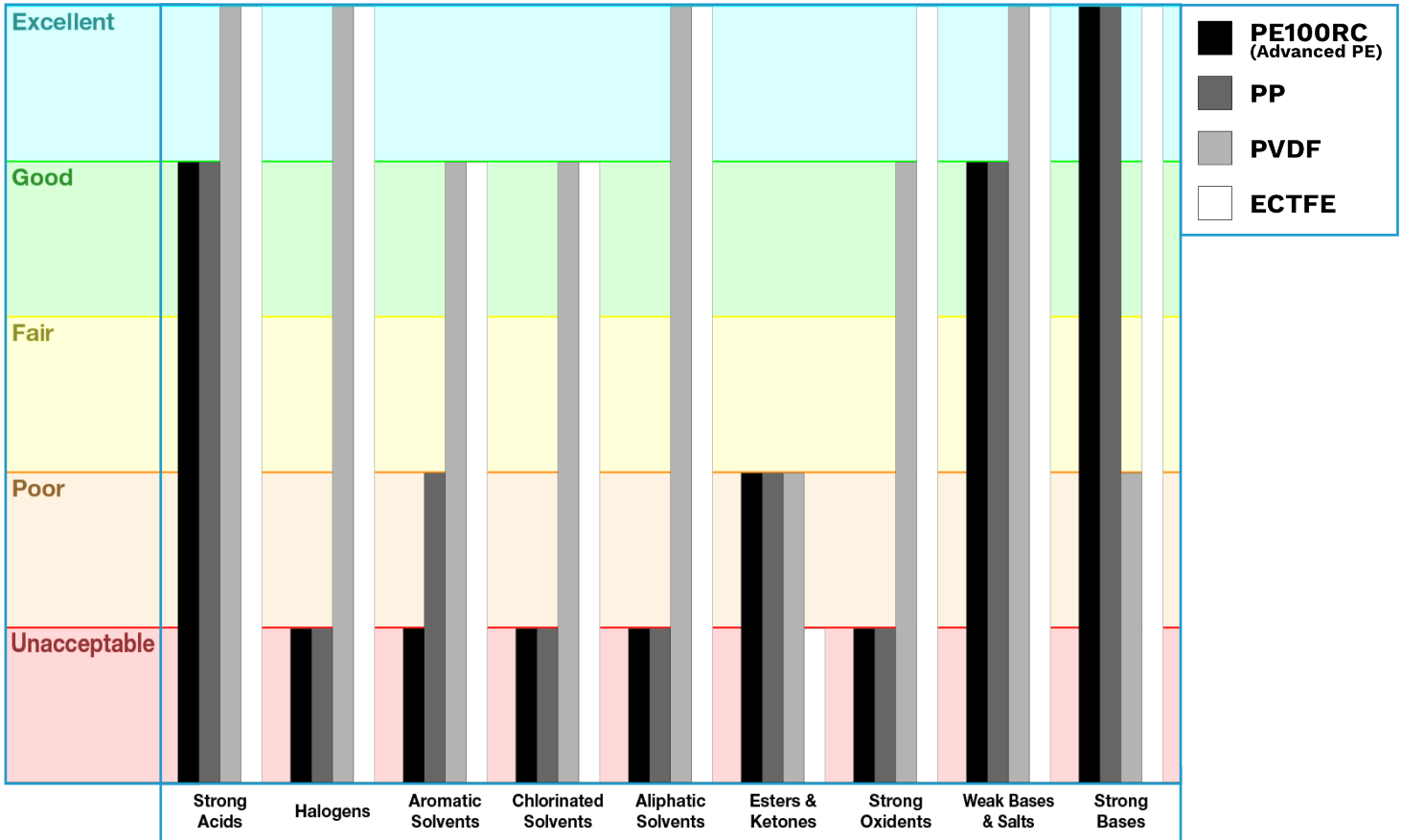
*The table above notes Asahi/America piping and fittings for drainage applications. Please consult Asahi/America for pressure ratings on fabricated fittings. SDR reference is for dimensional purposes only. For any questions, please consult Asahi/America's technical team at 1-800-343-3618 or pipe@asahi-america.com.



The fittings referenced above are a general sampling of what Asahi/America offers. For more information on available fittings for each product line, please contact us.

CHEMICAL RESISTANCE

Please note: the chart below is general recommendations for reference only. Please consult Asahi/America's technical service team at 1-800-343-3618 or pipe@asahi-america.com for proper application-related selection of materials.



DIFFERENCE BETWEEN HOMOPOLYMER AND COPOLYMER

The properties of the PP random copolymer make a good complement to the PP homopolymer, especially when used in pipes. The random copolymer provides a more elastic, higher impact strength material for areas where bumps and knocks are a higher probability. Additionally, the random copolymer can provide better stress crack resistance under lower operating temperatures if the environment is a factor.

PROPERTY	PP HOMOPOLYMER	PP COPOLYMER
STIFFNESS	BEST	GOOD
TOUGHNESS/IMPACT RESISTANCE	GOOD	BEST
STRESS CRACK RESISTANCE	GOOD	BEST
CHEMICAL RESISTANCE/ WELDABILITY	GOOD	GOOD
PROCESSABLE	GOOD	BEST

JOINING METHODS

HEAT FUSION WELDING

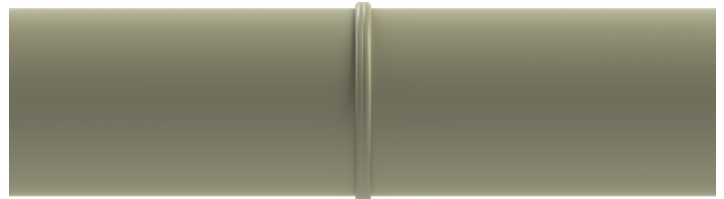
There are four main joining methods used for Asahi/America's industrial piping systems: contact butt, socket, electrofusion, and infrared (IR or butt) fusion. Often a system will employ more than one of these options in order to facilitate the installation in the best way possible. Each method yields a fully pressure-rated fusion joint that is as strong as the pipe itself. The time to complete a pressure-ready joint is shorter than other joining methods like solvent cementing PVC and CPVC pipes, welding, soldering or threading metal pipes, adhesive bonding FRP pipes or flaring/flanging lined steel pipes.

Asahi/America maintains and offers a full line of butt, socket, electrofusion, and IR fusion tools for purchase or rental. For more information, please visit our website at www.asahi-america.com or contact rental@asahi-america.com.



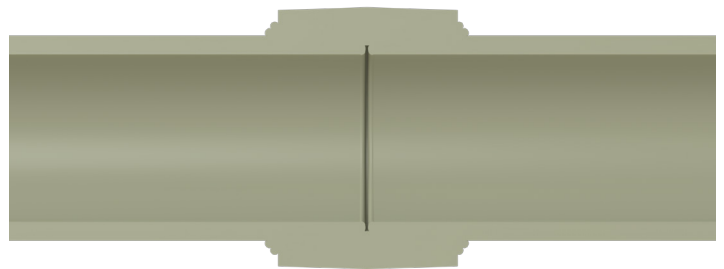
BUTT FUSION

Butt fusion joins the ends of the pipes and/or fittings. The prepared ends are heated and directly butted together to constitute the joint. This method always produces a minimum bead on both the inside and outside of the joint. In this method, couplings are not required to make connections. Butt fusion is available in two formats: contact and non-contact (also known as infrared or IR). In contact fusion, the material touches the heater plate and in non-contact fusion, the material does not touch the heat source, which is at a considerably higher temperature than contact butt fusion heaters. Most industrial fluid handling applications use contact fusion. Butt fusion is available for use with our complete pipe size range.

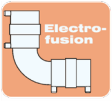


SOCKET FUSION

Socket fusion is achieved when the inside socket of the fitting and the outside surface of the pipe are melted and the pipe is then inserted into the socket of the fitting. This method is available in pipe sizes from 1/2" up to 4". Socket fusion tools are available in a hand-held version and a bench version. Hand-held socket fusion is usually used for smaller sizes (1/2" - 1-1/2") while the bench tool can be used for all sizes.

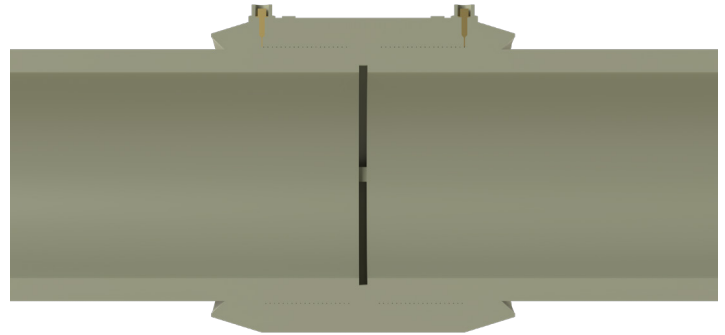


Asahi/America offers a tiered weld training program to operate all machines. Please consult Asahi/America technical services team for tool and training recommendations.



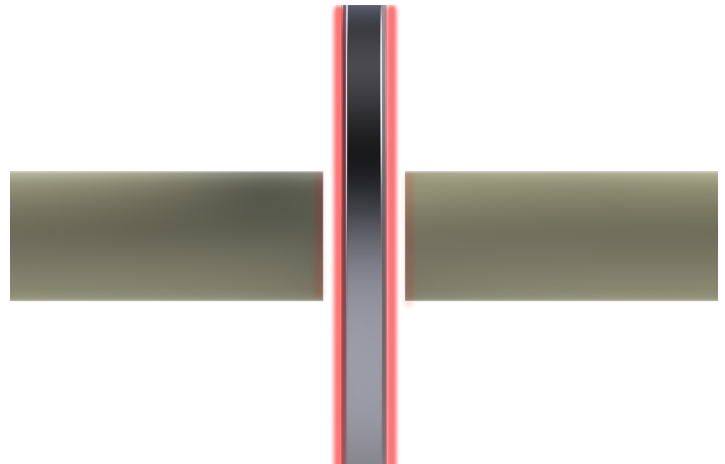
ELECTROFUSION

Electrofusion utilizes couplings only. The couplings incorporate an electrical coil in the weld zones of the coupling. As voltage is applied to the connection tabs on the external portion of the coupling, heat is generated within the coil to create the component fusion. Electrofusion is used more for convenience rather than as the primary joining method for an entire project. It is especially useful in making position joints over head in a rack where it is more difficult to use butt or socket fusion, or as a final closure coupling in a system.



INFARED (IR) FUSION

Infrared (IR) welding is a non-contact method that uses a heated plate to melt pipe and fittings before joining. The welded components are heated at a prescribed distance from the heater plate for a precise time to ensure optimal temperature is achieved, after which the components are brought together under pressure and allowed to create a homogeneous weld joint. This method utilizes a specific Asahi/America Series SP tool that controls most aspects of the fusion process. This is the preferred method for joining ECTFE material.



Asahi/America offers a tiered weld training program to operate all machines. Please consult Asahi/America technical services team for tool and training recommendations.

For more than 50 years, Asahi/America has been a leader in thermoplastic solutions, offering a wide range of industry-leading products, including valves, actuators, and piping systems. Our expertise also extends to **custom pre-fabrication**, where we serve a variety of industries with high-quality pre-fabricated pipe spools, manifolds, ductwork specialty fittings, and custom machined components. These tailored solutions are designed to **improve quality**, **lower costs**, and **enable seamless system integration**. Whether solving complex challenges or enhancing existing systems, Asahi/America remains dedicated to providing innovative, dependable, and cost-effective thermoplastic solutions. Learn more at www.asahi-america.com/custom-fabrication





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